Tissue-Inspired Synthetic Biomaterials

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Improved experimental model systems are critically needed to better understand cancer progression and bridge the gap between lab bench proof-of-concept studies, validation in animal models, and eventual clinical application. Many methods exist to create biomaterials, including hydrogels, which we use to study cells in contexts more akin to what they experience in the human body. Our lab has multiple approaches to create such biomaterials, based on combinations of poly(ethylene glycol) (PEG) with peptides and zwitterions. In this presentation, I will discuss our synthetic approaches to building life-like materials, how we use these systems to grow cells and understand how a cell's environment, particularly the extracellular matrix regulates cancer cell growth, dormancy, and drug sensitivity.

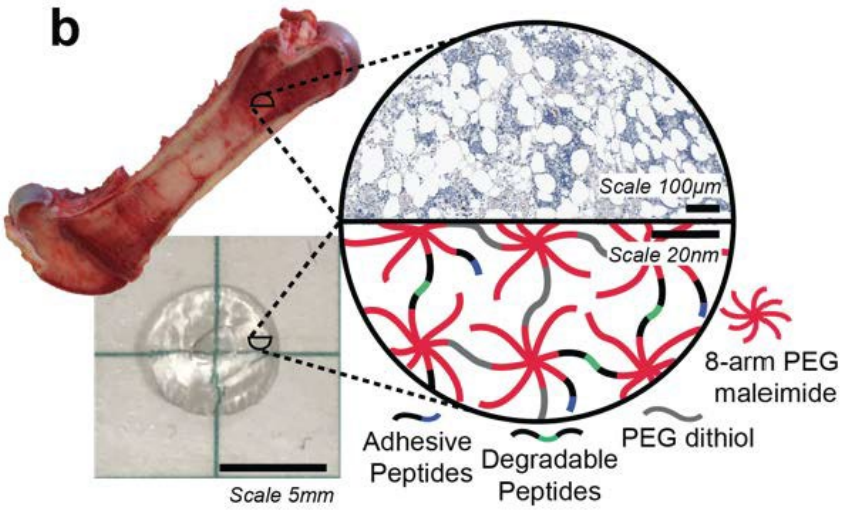

Figure:(Example of bone marrow-mimicking hydrogel) *we use a combination of mechanical characterization and tissue mass spectrometry to analyze real tissues (bone marrow example shown). Then we approximate those tissue characteristics with combinations of synthetic polymers and peptides for a variety of applications in cancer, tissue engineering, and TBI.*